PEACE/WILLISTON
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COMPENSATION
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Report, Vegetation Map, Ungulate Capability Map and Habitat Enhancement Plan for Dunlevy Inlet (Block A, D.L. 754 Williston Lake, B.C.)

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N.B. Maps and photos are available with the original report only. They can be obtained from the Peace/Williston Compensation Program office at;

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1.0 INTRODUCTION

In October 1990 a contract was issued to gather information, compile maps and submit a report describing the biophysical habitats, ungulate capability and a habitat enhancement program for an area recently purchased by the Nature Trust of British Columbia. The area under investigation consists of a 681 hectare parcel of abandoned fields, brushy slopes, aspen shrubland, and conifer forest above the Peace Arm of Williston Lake . The property is about 19 km north west of the W.A.C. Bennett dam near Hudson's Hope B.C.. The study area has been noted as a winter range for moose, elk and mule deer.

2.0 METHODS

2.1 VEGETATION AND SOIL SAMPLING

Field work was conducted October 18, 19, and 20, 1990. The sampling regime consisted of eight transects through sites that were typical of the common biophysical habitat units (Demarchi et.al. 1990) present in the area. The distances along the transects were correlated with changes in vegetation, site, soil or utilization by ungulates. Notes were made for each transect. Within each transect vegetation, soil, and site data were collected within homogenous units and noted on an Ecological Classification Reconnaissance field form (Ministry of Forests FS882 form). See Appendix 1. Photographs were taken of representative units. Unknown plant species were collected and identified later.

2.2 BIOPHYSICAL HABITAT UNIT MAPPING

Transects were marked on 20 chain air photographs. The photos were typed into units of similar vegetation and environmental conditions. Biophysical habitat units were described using data collected along transects that crossed through the units.The methods used to describe units are from Demarchi et.al.(1983). These units were extrapolated to areas not sampled but with a similar appearance on the air photos.

The vegetation and environmental conditions of derived biophysical units were compared to similar studies in an adjacent area called the Lower Halfway (Lea et.al. 1989) and to the B.C. Ministry of Forests ecological classification for the entire area by DeLong et.al.(1990). Similar units were given names that were consistent with others in the Lower Halfway study. However, the scale of this study was 1:16,000 dealing with one small specific landscape, while the Lower Halfway biophysical mapping done in the area was at 1:50,000. The level of detail in this study was greater and some vegetation units were not directly comparable.

The seral stage of each biophysical map unit was determined using a six level classification (Demarchi et.al., 1990). The seral stages used in this study are as follows :

1-Grass Forb
2-Low Shrub
3-Pole Sapling
4-Young Forest
5-Mature Forest
6-Old Growth

2.3 UNGULATE CAPABILITY MAPPING

Ungulate capability was mapped using the methods described in Demarchi et.al. (1983). Capability ratings for moose, elk, mule deer and white-tailed deer were determined by comparison with ungulate capability ratings for the Lower Halfway area and through discussions with Peter Davidson of the B.C. Ministry of Environment in Fort St. John and Keith Simpson of Keystone Research, a contractor familiar with wildlife values for the study area.

Capability units were derived from areas classified as belonging to a single biophysical map unit or a complex of units. The dominant features uniting these units are snow depth, soil moisture and vegetation.

The area of each capability class was determined from the map and the potential carrying capacity for each ungulate species was calculated using values reported in Demarchi et.al. (1983).

2.4 HABITAT ENHANCEMENT MAP

Biophysical habitat units were used as the basis for suggested habitat enhancement activities for the study area. Simpson (pers.com.) noted that spring burning was the most cost effective and commonly used habitat enhancement tool for this area. Within these units the present suitability of the landscape to support ungulates in the winter was assessed. This was derived by examing the utilization and the seral stage of each biophysical unit. The heterogeneity of the entire study area was assessed using the criteria necessary for good winter range for ungulates (Lea, et.al, 1990 and Simpson, pers.com.). The ability of each unit to respond to spring burning was assessed by noting soil moisture and dominant vegetation. Areas of heavy utilization were noted. Forested areas that are necessary for thermal and hiding cover were identified. Areas that should be reverted to forested cover were noted. Enhancement polygons were derived from this analysis.

3.0 RESULTS

3.1 ECOREGION

The study area is found in the Halfway Ecoregion.

3.2 BIOGEOCLIMATIC SUBZONES

There are three biogeoclimatic subzones present in the study area. Refer to Delong et.al. (1990) for a complete description of these subzones.

3.21 BWBSmwl

The Peace Moist Warm Boreal Black and White Spruce subzone is found at the lower elevations between 750 and 1050 metres.

3.22 BWBSwkl

The Murray Wet Cool Boreal Black and White Spruce subzone is found at elevations above the BWBSmwl between 1050 and 1220 metres. In the study area this is a transitional subzone found above the BWBSmwl and between the BWBS and the ESSF that starts to occur above elevations of around 900 metres. It is of limited extent and mostly occurs as a poorly defined transitional type above the BWBSmwl on the northern boundary of the study area.

3.23 ESSFnl

The Wet Rocky Mountain/Omineca Mountain Engelmann Spruce Subalpine Fir Subzone Moberly Variant is found above the BWBSwkl at elevations between 1100 and 1600 metres.

3.3 BIOPHYSICAL HABITAT UNITS

The vegetation, environmental features and seral stages of the biophysical habitat map units are described in the map legend found in Appendix 2.

The biophysical habitat units found in the study area are:

BWBSmwl

CF - Cultivated field moist
CFw - Cultivated field wet
AS - Trembling Aspen - Saskatoon south aspect
WP - Wildrye Peavine
AR - Trembling Aspen Prickly Rose fine textured soil
BC - Black Twinberry Cow Parsnip Bluejolnt
PC - Balsam Poplar Highbush Cranberry moist soil
BP - Black Spruce Sphagnum

BWBSmwl/BWBSwkl transition

WPb - Wildrye Peavine broken slopes
AR - Trembling Aspen Prickly Rose fine textured soil
ARb - Trembling Aspen Prickly Rose fine textured soil broken
OC - Oak Fern Cow Parsnip Bluejoint

ESSFnl

BS - Bunchberry Stiff Clubmoss
RHn - White-flowered Rhododendron Black Huckleberry northern exposures
RHw - White-flowered Rhododendron Black Huckleberry western exposures
RO - Rock outcropping

3.4 UNGULATE CAPABILITY

Table 1. presents the number of hectares present for each winter capability class present in the study area. Table 2. presents the potential carrying capacity by species for the study area.

Davidson noted between thirty-five and seventy elk on the lower slopes of the study area in spring. Simpson noted moose, elk, and mule deer on the open slopes in early January, 1991. Simpson suggested that a biophysical unit, Saskatoon-Wheatgrass (SW), described in the Lower Halfway Biophysical had a Class 1 winter capability to support elk and mule deer. The vegetation noted on the lower slopes of the study area did not fit into the SW unit, but appeared to be slightly moister. However, the driest of areas on the lower slopes, classified as WP (Wildrye-Peavine) by this study, may have a winter capability of slightly higher than Class 2. Davidson's observation of up to seventy elk on the site in the spring may support this.

The habitat enhancement activities suggested in section 3.5 could increase the number of animals expected to utilize this area as winter range to the maximum of the suggested carrying capacity.

TABLE 1. Hectares of winter range capability classes for Blk A, D.L. 754 Williston Lk.

SPECIES	CLASS 1	CLASS 2	CLASS 3	CLASS 4
MOOSE	66.0	453.4	161.6	0.0
ELK	0.0	519.4	161.6	0.0
MULE DEER	0.0	519.4	0.0	161.6
WHITE-TAIL DEER	0.0	0.0	519.4	161.6

TABLE 2. Carrying capacity by species for Blk A, D.L. 754 Williston Lk. Based on estimates from Demarchi et.al. (1983) for winter range capability classification.

SPECIES	ANIMALS CLASS 1	ANIMALS CLASS 2	ANIMALS CLASS 3	ANIMALS CLASS 4	TOTAL AREA
MOOSE	3.0-4.0	14.1-20.4	2.6- 4.8		19.7-29.2
ELK		34.3-50.9	5.5-10.5		39.8-61.4
MULE DEER		55.6-82.1		1.9-8.6	57.5-90.7
WHITE-TAIL DEER			28.0-55.1	3.1-8.6	31.1-63.7

TABLE 3. Habitat enhancement regime for Dunlevy Inlet Blk.A, D.L.754 Williston Lake.

TREATMENT	AREA
1. MAINTAIN EXISTING COVER AND PLANT TREES	22.5 HA.
2. SPRING BURN ON A FOUR YEAR ROTATION	294.7 HA.
3. SPRING BURN ON A TWO YEAR ROTATION	172.2 HA.
4. MAINTAIN EXISTING FORESTED COVER	191.6 HA.
TOTAL	681.0 HA.

3.5 HABITAT ENHANCEMENT

Suggested enhancement activities are illustrated on the habitat enhancement map. Number of hectares devoted to each treatment is presented in Table 3.

Four treatments are suggested for the study area based upon the philosophy that it is desirable to maintain and create early seral stages in the biophysical habitat units where grasses and shrubs dominate. This is especially important in areas with warm aspects that are frequently utilized in the late winter and early spring. Enhancement activities should also encourage the presence of forested areas for hiding and thermal cover.

The suggested enhancement treatments are as follows:

1. Maintain existing forested cover and augment with planting of species such as trembling aspen, lodgepole pine and white spruce.

This treatment is suggested for the southern boundary of the property along the road. The open lower slopes will eventually be hidden from the road by vegetation. This will decrease the disturbance from the road to animals using the lower reaches of the property and will increase habitat for birds and small mammals.

2. Spring burn on a four year rotation.

This treatment is suggested for the drier biophysical habitat units where a burn will encourage the growth of grasses and paletable shrubs common to the early seral stages of these units. Vegetation should be slow to grow out of reach to ungulates on these sites. A four year burn cycle is proposed as appropriate for the productivity of vegetation on these sites.

3. Spring burn on a two year rotation.

This treatment is suggested for the moist biophysical habitat units. These units are presently choked with dense trembling aspen and balsam poplar. The moist nature of these areas requires more frequent burning to open up the stands to early seral vegetation. The nature of a burn on these types of sites is likely to be more patchy than a burn on a dry site. This is a positive feature for an area that is adjacent to open, heavily utilized, drier units because it creates a heterogenous stand of open and treed areas. The treatment increases the early seral stages available to animals and creates more "edge" adjacent to the open areas.

4. Maintain forested cover.

These areas are presently supporting an overstory of trembling aspen or mixed stands of trembling aspen, lodgepole pine and white spruce. The biophysical habitat units composing these areas are generally moist towet and occupy the upper elevations of the study area. The gully associated with Gravel Hill Creek also fits into this type. These areas would be difficult to burn and the vegetation would quickly grow out of reach to most animals. Left undisturbed these areas offer cover and movement corridors for animals using the open slopes at the south end of the property.

3.6 NON-UNGULATE SPECIES PRESENT IN DUNLEVY BLK A, D.L.754 WILLISTON LK.

Wildlife other than ungulates potentially present in the study area are listed in Table 4. Species observed on the site during field work are marked with an asterisk. This list has been derived from a number of sources including Siddle (1989), McTaggert Cowan and Guiguet (1978), Smith (1978), Smith and Brodie (1982) and from personal communication with various individuals familiar with the area. It is based on the known ranges of these species and their described habitat preferences. Not all of the species listed in Table 4 have been sited in the study area.

Table 4. Non-ungulate species potentially observable on Dunlevy Blk A, D.L. 754 Williston Lake.

REPTILES AND AMPHBIANS	BIRDS	MAMMALS
Common Garter Snake (eastern subspecies)	Bald Eagle	Snowshoe Hare*
Western Toad	Sharp-shinned hawk	Least Chipmunk
Northern Chorus Frog	Northern Goshawk	Red Squirel
	Red-tailed Hawk	Northern Flying Squirel
the above species are near the northern limits of their described range	Rough-legged Hawk	Deer Mouse
	Golden Eagle	Pack Rat
	American Kestrel	Boreal Red-back vole
	Spruce Grouse	
	Blue Grouse	
	Ruffed Grouse	Meadow Vole
Wood Frog	Killdeer	Long-tail vole
	Common Snipe	Meadow Jumping Mouse
	Wilson's Phalarope	Western Jumping Mouse
	Rock Dove	
	Great Horned Owl	Porcupine
	Common Nighthawk	Coyote*
	Rufous Hummingbird	Wolf
	Yellow-bellied Sapsucker	Red Fox
		American Black Bear
	Northern Flicker	
	Pileated Woodpecker*	Grizzly Bear
	Western Wood-Pewee	Marten
	Alder Flycatcher	Fisher
	Least Flycatcher	Short-tailed Weasel
	Bank Swallow	
	Cliff Swallow	Least Weasel
	Barn Swallow	Striped Skunk
	Gray Jay*	Canada Lynx
	Black-billed Magpie	
	Common Raven	
	Black-capped Chickadee*	
	Red-breasted Nuthatch	
	Ruby-crowned Kinglet	
	Swainson's Thrush	
	American Robin	
	Cedar Waxwing	
	European Starling	
	Warbling Vireo	
	Red-eyed Vireo	
	Yellow-rumped Warbler	
	American Redstart	

Table 4. Non-ungulate species potentially observable on Dunlevy Blk A, D.L. 754 Williston Lake, continued...

REPTILES AND AMPHBIANS	BIRDS	MAMMALS
	Clay-coloured Sparrow	
	Savannah Sparrow	
	Lincoln's Sparrow	
	Swamp Sparrow	
	Dark-eyed Junco*	
	Snow Bunting	
	Red-winged Blackbird	
	Brewer's Blackbird	
	Brown-headed Cowbird	
	Northern Oriole	
	Purple Finch	
	Pine Siskin	
	House Sparrow	

4.0 DISCUSSION

Sampling for this study was carried out in late October, 1990. The ground was covered with up to 10 cm. of snow in some places. Consequently, the vegetation was very difficult to assess because much of it was dried, damaged by frost, and under cover of snow. The snow also hindered observations of site utilization by ungulates that might have been derived from counting pellet groups. It is important to note to managers of funds that faciliate these types of studies to note, that the best time of year for field sampling is in July. Theoretically, a number of visits to a site throughout the growing season would produce a better and more accurate description of vegetation, terrain, and utilization by wildlife than a single trip late in the season.

Spring burning in 1991 of 467 ha. of open and shrubby areas would give immediate improvement to the nature of the habitat of this property. Simpson (pers.com.) noted that the average size of burn proposed for the Dawson Creek Forest District is about 2900 ha. (range 204-4020 ha.). The burning required in the study area is relatively small by Ministry of Forests criteria.

Habitat enhancement within the study area may take pressure off some areas east of the study area that appear to be well utilized on air photos. Animals traveling down Gravel Hill Creek from upland ridges to the north and east may utilize the area more frequently if visability from the road is reduced by trees.

A local person familair with the property noted that a forested valley to the north of the study area is frequently used by elk for cover in the winter. He believes that the Ministry of Forests has slated this area for clearcut logging in the near future. We suggest that, if this is the case, that the area to be affected be noted by Habitat Protection personnel from the Ministry of Environment. It may be an important part of the complex of habitat units inmportant to the overall winter range value of the study area.

REFERENCES CITED

DeLong, C., A. MacKinnon and L. Jang. 1990. A Field Guide for Identification and Interpretation of Ecosystems of the Northeast Portion of the Prince George Forest Region. B.C. Ministry of Forests Land Management Handbook No. 22.

Demarchi,D.A., B.Fuhr, B.A. Pendergast, and A.C. Stewart. 1983. Wildlife Capability Classification for British Columbia: An Ecological (Biophysical) Approach for Ungulates. B.C. Ministry of Environment Manual 4. 56 p.

Lea, E.G., D.A.Demarchi, and L.E.H. Lacelle. 1990. Biophysical Analysis of the Sheep Mountain Wildlife Area. Wildlife Bulletin No. B-66. B.C. Ministry of Environment.

Lea, E.G., L.E.H Lacelle, Stewart, A. 1989. Lower Halfway Biophysical. B.C. Ministry of Environment. Wildlife Working Report Number WR-43.

McTaggert Cowan, 1. and C.J. Guiguet. 1978. The Mammals of British Columbia. Handbook No. 11. British Columbia Provincial Museum.

Siddle, C. 1989. Checklist of the Birds of the Peace River Region of British Columbia. Final Draft, unpublished document to the Habitat Conservation Fund.

Smith, H.M. 1978. A Guide to Field Identification- Amphibians of North America.Gold Press, New York.
Western Publishing Company, Inc. Racine, Wisconson.
240 p.

Smith, H.M. and E.D. Brodie Jr. 1982. A Guide To Field Identification- Reptiles of North America. Gold Press, New York. Western Publishing Company, Inc. Racine, Wisconson. 240 p.

APPENDIX 1. EXAMPLE OF DATA FORM

APPENDIX 2. BIOPHYSICAL HABITAT MAP LEGEND

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS
Biogeoclimatic subzone - BWBS m w 1 Peace Boreal White and Black Spruce (formerly BWBSc1) 750 - 1050m
Nonforested habitat units

Map Symbol	CF cultivated field - moist	CFw cultivated field - wet	RO rock outcrop
Description	cleared field on level to gently sloping, silty, lacustrine deposits; mesic moisture regime	cleared field in slightly depressional landscape on fine textured (SiCL) lacustrine deposits Subhygric moisture regime.	Smooth, steeply (45-70%) sloping, exposed bedrock surfaces.
Characteristic Plant Species Dominants (>20%)	smooth brome dandelion	timothy alsike clover	none
Associates (5 - 20%)	timothy alsike clover showy aster	smooth brome	sparse vegetation including lodgepole pine saskatoon kinnikinnick fuzzy wildrye
Potential Forage For Wild Ungulates >20%	smooth brome	timothy alsike clover	nil
5 - 20%	timothy alsike clover	smooth brome	saskatoon kinnikinnick fuzzy wildrye
Plot #s	1 -(1), 1 -1, 4-(1)	4 - 1	
Comments:	based on soil moisture regime & slope position, this habitat unit is roughly equivalent to the B.C. Forest Service (Delong et al, 1990) BWBS mw1/01 site series	based on soil moisture regime & slope position, this habitat unit is roughly equivalent to the B.C. Forest Service (Delong et al, 1990) BWBS mw1/06 site series	vegetation growing in thin pockets of soil that have collected in cracks & slight depressions of the outcropping bedrock surfaces.

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic subzone - BWBSmw1 - (FORMERLY BWBS1) Peace Boreal White & Black Spruce (750 - 105m)
Biophysical habitat unit - trembling aspen - Saskatoon; southerly aspect (AS)
Description - South facing, wind exposed slopes with fine textured lacustrine veneers over gravelly material and bedrock. Subxeric to submesic moisture regimes.

Map Symbol	AS 1	AS 2	AS 3	AS 4	AS 5	AS 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	wildrye kinnikinnick	wildrye kinnikinnick birch-leafed spirea rose	trembling aspen wildrye kinnikinnick	lodgepole pine trembling aspen wildrye kinnikinnick	lodgepole pine white spruce kinnikinnick wildrye	lodgepole pine kinnikinnick wildrye cladina
Associates (5-20%)	Indian paintbrush showy aster Saskatoon rose	soopolallie Saskatoon showy aster Indian paintbrush	willow lodgepole pine white spruce showy aster	white spruce rose birch-leafed spirea birch-leafed spirea soopolallie	tr.aspen rose birch-leafed spirea soopolallie h.b. cranberry twinflower bunchberryr	rose birch-leafed spirea soopolallie highbush cranberry bunchberry twinflower
Potential Forage For Wild Ungulates >20%	wildrye kinnikinnick	wildrye kinnikinnick rose	trembling aspen wilrye kinnikinnick	trembling aspen wildrye kinnikinnick	kinnikinnick wildrye	kinnikinnick wildrye cladina
5-20%	Saskatoon rose	Saskatoon soopolallie	rose soopolallie	rose soopolallie	rose soopolallie highbush cranberry	rose soopolallie highbush cranberry
Ptot #s	6 - 1					

Comments: Slow rate of succession, frequently burnt, low snow cover. This habitat is roughly equivalent to the B.C. Forest Service (Delong et at, 1990) BWBS mw 1/02 - 03 ecosystem unit.

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic subzone - BWBS m w 1 - Peace Boreal Black and White Spruce (formerly BSBWC1) (750 - 1050m)
Biophysical habitat unit - WILDRYE PEAVINE (WP)
Description - South and westerly aspects on moderately slopingon fine textured lacustrine veneers or blankets. Submesic moisture regimes.

Map Symbol	WP1	WP 2	WP 3	WP 4	WP 5	WP 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	wildrye	rose wildrye	trembling aspen wildrye showy aster	tr. aspen wildrye showy aster	tr. aspen lodgepole pine wildrye	lodgepole pine white spruce wildrye
Associates (5 - 20%)	rose willow showy aster bluejoint timothy	willow showy aster bluejoint soopolallie	willow balsam poplar rose fireweed p. wintergreen bunchberry Indian paintbrush Am. vetch	lp. pine white spruce willow balsam poplar rose twinflower bunchberry showy aster	white spruce rose highbush cranberry twinflower bunchberry showy aster	rose highbush cranberry soopolallie birch-leafed spirea twinflower bunchberry showy aster
Potential Forage For Wild Ungulates >20%	wildrye	rose wildrye	tr. aspen wildrye	trembling aspen wildrye	wildrye	wildrye
5 - 20%	rose willow bluejoint timothy	willow bluejoint	willow balsam poplar rose fireweed	willow balsam poplar rose	trembling aspen rose highbush cranberry	rose highbush cranberry soopolallie
Plot #s	5 - 2 1 - 5		5 -1 7 -1 1 - (3) 8-1 1 -2, 4 - (2) 4 - 2			

Comments: Frequently burnt, low to moderate show cover; roughly equivalent to the B.C. Forest Service (Delong et al, 1990) BWBSmw1/03 site series.

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic subzone - BWBS mw 1/w k 1 transition
Biophysical habitat unit - WILDRYE - PEAVINE broken and/or steep slopes (WPb)
Description - west aspect on broken and/or steep terrain with colluvium and shallow lacustrine veneer over bedrock. Submesic moisture regime.

Map Symbol	1	2	WPb 3	4	5	6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)			tr. aspen wildrye showy aster			
Associates (5 - 20%)			paper birch lodgepole pine Sitka alder willow rose twinflower			
Potential Forage For Wild Ungulates >20%			tr. aspen wildrye			
5 - 20%			paper birch willow rose			
Plot #s			2 -(3)			

Comments: Frequently burnt, low to moderate snow cover. This habitat unit is roughly equivalent to the B.C. Forest Service (Delong et al, 1990) transitional BWBS mw/03 - BWBS wk/04 site series.

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic subzone - BWBS m w 1 Peace Moist Warm Boreal White and Black Spruce variant (formerly (BWBS e 1) 750 - 1050m
BWBS mw 1/wk 1 transition; BWBS wk 1 = Murray Wet Cool BWBS variant (formerly BWBS d 1) 1050 - 1220m
Biophysical habitat unit - trembling aspen - prickly rose; fine textured soil (AR)
Description - Predominantly gentle to moderately sloping lacustrine blankets; mesic moisture regime.

Map Symbol	AR 1	AR 2	AR 3	AR 4	AR 5	AR 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	wildrye fireweed bluejoint	Sitka alder willow wildrye	tr. aspen wildrye*	tr. aspen	tr. aspen	white spruce
Associates (5 - 20%)	Sitka alder willow showy aster American vetch	tr. aspen balsam poplar rose bluejoint fireweed showy aster American vetch	balsam poplar Sitka alder* willow, rose bluejoint* fireweed showy aster American vetch	balsam poplar Sitka alder willow, rose h.b.cranberry b.l. spirea wildrye bluejoint fireweed showy aster	balsam poplar lodgepole pine white spruce S. alder, rose h.b.cranberry b.l. spirea wildrye bluejoint fireweed, aster	lp. pine tr. aspen balsam poplar rose h.b.cranberry Sitka alder b.l. spirea bunchberry twinberry
Potential Forage For Wild Ungulates >20%	wildrye fireweed bluejoint	willow wildrye	tr. aspen wildrye	—		—
5 - 20%	willow	tr. aspen balsam poplar rose bluejoint fireweed	balsam poplar willow rose bluejoint fireweed	willow rose h.b.cranberry wildrye bluejoint fireweed	rose h.b.cranberry wildrye bluejoint	rose h.b.cranberry
Plot #s			1 - 3, 3 -1 7 -2	2 - 1, (2) 3-(1) (2) 3 (4) (5)	1 - 4, 2 - 2 3 - 4	

Comments: Young, forested successional stage is the most common habitat unit in the study area. It occurs predominantly as a dense forest canopy phase. The AW unit is roughly equivalent to the B.C. Forest Service (Delong et al, 1990) BWBSmw1/01 site series and the transitional BWBSmw1 - wk1/01 ecosystem. Lodgepole pine was observed to be uncommon in this unit throughout the study area. *Sitka alder can occur as either a dominant or an associate speces depending on the severity of disturbance. Wildrye & bluejoint can be either dominant or associates depending on available site moisture.

DUN12

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic subzone - BWBS m w 1/ wk1 transition
Biophysical habitat unit - trembling aspen - prickly rose; fine textured soils, broken (ARb)
Description - west aspect on broken and/or steep terrain with colluvium and lacustrine veneer over bedrock

Map Symbol	1	2	3	ARb 4	5	6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)				tr. aspen Sitka alder		
Associates (5-20%)				paper birch lodgepole pine willow rose birch-leafed spirea wildrye showy aster		
Potential Forage For Wild Ungulates >20%				—		
5-20%				willow rose wildrye		
Plot #s						

Comments: This habitat unit roughly equivalent to the B.C. Forest Service (Delong et al, 1990) transitional BWBS mw1-wk1/01 ecosystem unit.

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic subzone - BWBSmw 1/BWBS wk 1 transition
Biophysical habitat unit - OAK FERN - COW PARSNIP - BLUE JOINT (OC)
Description - Moderately steep, west facing slopes on fine textured lacustrine blankets with some scattered boulder size colluvial material. Mesic to suhygric moisture regimes.

Map Symbol	OC 1	OC 2	OC 3	OC 4	OC 5	OC 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	bluejoint fireweed	trembling aspen Sitka alder bluejoint	trembling aspen Sitka alder bluejoint	trembling aspen Sitka alder bluejoint	tr. aspen bluejoint	white spruce
Associates (5-20%)	trembling aspen balsam poplar Sitka alder rose highbush cranberry	balsam poplar birch-leafed spirea high bush cranberry rose fireweed	highbush cranberry birch-leafed spirea balsam poplar oak fern twinflower fireweed	highbush cranberry birch-leafed spirea balsam poplar oak fern twinflower	white spruce h.b. cranberry Sitka alder birch-leafed spirea balsam poplar oak fern	highbush cranberry Sitka alder birch-leafed spirea oak fern twinflower bluejoint bunchberry
Potential Forage For Wild Ungulates >20%	bluejoint fireweed	trembling aspen bluejoint	bluejoint	bluejoint	bluejoint	
5-20%	trembling aspen balsam poplar rose highbush cranberry	balsam poplar highbush cranberry rose fireweed	highbush cranberry fireweed	highbush cranberry	highbush cranberry	highbush cranberry bluejoint
Plot #s				2 - 3		
Comments:	This habitat unit is roughly equivalent to the B.C. Forest Service (Delong et al, 1990) BWBS wk 1/01 - 05 ecosystem unit.					

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic suzone - BWBSmw1/BWBSwk1 Transition
Biophysical habitat unit - BLACK TWINBERRY - COW PARSNIP - BLUEJOINT (BC)
Description - Lower slopes and slight depressional areas on fine textured lacustrine blankets with imperfectly drained soils and subhygric moisture regimes

Map Symbol	BC 1	BC 2	BC 3	BC 4	BC 5	BC 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	bluejoint fireweed	Sitka alder fireweed bluejoint	balsam poplar Sitka alder bluejoint	balsam poplar Sitka alder bluejoint	balsam poplar white spruce	white spruce
Associates (5 - 20%)	Sitka alder balsam poplar black twinberry highbush cranberry rose	balsam poplar black twinberry highbush cranberry rose willow twinflower	trembling aspen black twinberry highbush cranberry rose willow fireweed twinflower	trembling aspen black twinberry highbush cranberry rose tall bluebells bunchberry fireweed twinflower white spruce	tr. aspen bl. twinberry h.b. cranberry Sitka alder bluejoint rose bl. gooseberry tall bluebells twinflower bunchberry fireweed tr. raspberry p. coltsfoot	balsam poplar bl. twinberry h.b. cranberry Sitka alder rose tr. raspberry bl. gooseberry tall bluebells bluejoint twinflower fireweed p. coltsfoot
Potential >20% Forage For Wild Ungulates	bluejoint fireweed	fireweed bluejoint	balsam poplar bluejoint	bluejoint		
5 - 20%	balsam poplar black twinberry highbush cranberry rose	balsam poplar black twinberry highbush cranberry rose willow	trembling aspen black twinberry highbush cranberry rose willow fireweed	black twinberry highbush cranberry rose black gooseberry fireweed	trembling aspen black twinberry highbush cranberry bluejoint fireweed	black gooseberry rose highbush cranberry fireweed
Plot #s					3 - (3)	

Black twinberry and highbush cranberry heavily utilizied in this unit. Roughly equivalent to the B.C.-Forest Service (Delong et at, 1990) BWBSwk1/05 site series or the BWBSmw1/06 unit at lower elevations.
White spruce may be an associate species in the BC 5 unit.

Biogeoclimatic subzone - BWBS mw1 and BWBSmw1/wk1 transition
Biophysics) habitat unit - Balsam poplar - highbush cranberry, moist soil (PC)
Description - low lying areas that receive upslope moisture. Fine textured lacustrine deposits with hygric moisture regimes.

Map Symbol	PC 1	PC 2	PC 3	PC 4	PC 5	PC 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	bluejoint horsetail	willow bluejoint horsetail	balsam poplar willow bluejoint horsetail	balsam poplar Sitka alder horsetail bluejoint	balsam poplar horsetail bluejoint	white spruce horsetail
Associates (5 - 20%)	willow Sitka alder balsam poplar bl. twinberry rose h.b. cranberry fireweed	tr. aspen balsam poplar Sitka alder rose bl. twinberry fireweed	tr. aspen Sitka alder bt. twinberry rose highbush cranberry red osier dogwood	tr. aspen willow rose highbush cranberry white spruce red osier dogwood bl. twinberry red osier dogwood	tr. aspen white spruce Sitka alder willow rose h.b. cranberry bi. twinberry bl. gooseberry tall bluebells p. coltsfoot twinflower	balsam poplarr rose h.b. cranberry bl. twinberryy bl. gooseberry tall bluebells p. coltsfoot twinflower tr. raspberry
Potential >20% Forage For Wild Ungulates	bluejoint	willow bluejoint	balsam poplar willow bluejoint	bluejoint		
5-20%	willow balsam poplar black twinberry rose highbush cranberry fireweed	tr. aspen balsam poplar bl. twinberry rose fireweed	trembling aspen bl. twinberry rose highbush cranberry red osier dogwood	willow rose highbush cranberry bl. twinberry red osier dogwood	willow rose highbuswh cranberry bl. twinberry	rose highbush cranberry black twinberry
Plot #s		1-(2)			2-(1) 2-4	

Comments: Well utilized, lots of animal trails; roughly equivalent to the B.C. Forest Service (Delong et al, 1990) BWBSwk1/06 or BWBSmw1/07 site series.

DUN1

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS
Biogeoclimatic subzone - BWBS m w 1
Biophysical habitat unit - Black Spruce - Sphagnum (BP)
Description - Depressional area with poor drainage. Organic veneer over fine textured lacustrine deposit. Hygric soil moisture regime.

Map Symbol	1	2	3	4	5	BP 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)						black spruce
Associates (5-20%)						white spruce willow Labrador tea mt. alder rose dwarf scouring rush bentgrass horsetail bluegrass p. coltsfoot wheatgrass lingonberry
Potential Forage For Wild Ungulates >20%						
5 - 20%						willow rose bentgass bluegrass wheatgrass
Plot#s						3 -2

Comments: Very limited extent in study area; roughly equivalent to the B.C. Forest Service (Delong et al, 1990) BWBSmw1 1/(07)-08 ecosystem unit

DUNLEVY ILET
BIOPHYSICL HABITAT UNITS

Biogeoclimatic suzone - ESSFnl Wet Rocky Mountain/Omineca Mountain Englemann Spruce Subalpine Fir Subzone Moberly variant (1100-1600m)

Biophysical habitat unit - BS bunchberry - stiff club-moss

Description - predominantly gentle upper slopes and ridge crest underlain by shallow morainal veneers; submesic moisture regime

Map Symbol	BS 1	BS 2	BS 3	BS 4	BS 5	BS 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	fireweed grasses ?	white-flowered rhododendron black huckleberry	subalpine fir Englemann spruce white-fiowered rhododendron	subalpine fir Englemann spruce	Englemann spruce subalpine fir white-flowered rhododendron	Englemann spruce subalpine fir white-flowered rhododendron
Associates (5-20%)	white-flowered rhododendron black huckle-berry	subalpine fir Englemann spruce trembling aspen fireweed grasses ?	trembling aspen black huckleberry fireweed	trembling aspen white flowered rhododendron	trembling aspen black huckleberry bunchberry stiff club-moss	black huckleberry bunchberry stiff club-moss
Potential Forage For Wild Ungulates >20%	fireweed grasses ?	black huckleberry	subalpine fir			
5 - 20%	black huckleberry	subalpine fir trembling aspen fireweed grasses ?	trembling aspen black huckleberry fireweed		black huckleberry	black huckleberry
Plot #s						

Comments: This habitat unit is roughly equivalent to the B.C. Forest Service (MacKi non, undated) ESSFnl/03 site series. This ecosystem unit lacks lodgepole pine.
None of the BS units were sampled. Game trails in the BS2 unit are obvious on aerial photographs.

DUNLEVY INLET
BIOPHYSICAL HABITAT UNITS

Biogeoclimatic suzone - ESSFnl - Wet Rocky Mountain/Omineca Mountain, Engleman Spruce Subalpine Fir Subzone, Moberly variant ~1100 - 1600m

Biophysical habitat unit - RHn white-flowered rhododendron - black huckleberry, northerly exposures
- RNw white flowered rhododendron - black huckleberry, west exposure

Description - RNn northwest to north exposures on mid to upper, moderately steep (30 - 45%) gullied slopes underlain by morainal & (colluvial) veneer over bedrock (submesic) to mesic moisture regime.
RNw west exposure on mid to upper, moderately steep slopes underlain by morainal & (colluvial) veneer over bedrock, (submesic) - mesic moisture regime.

Map Symbol	RN 1	RN 2	RN 3	RN 4	RN 5	RN 6
Characteristic Plant Species	Grass Forb	Low Shrub	Pole Sapling	Young Forest	Mature Forest	Old Growth
Dominants (>20%)	fireweed grasses ?	white-flowered rhododendron	lodgepole pine subalpine fir white-flowered rhododendron	lodgepole pine subalpine fir	Englemann spruce subalpine fir white-flowered rhododendron	Englemann spruce subalpine fir white-flowered rhododendron
Associates (5 - 20%)	white-flowered rhododendron black huckleberry	black huckleberry lodgepole pine subalpine fir tr. aspen balsam poplar fireweed grasses ?	Englemann spruce trembling aspen balsam poplar black huckleberry	white-flowered rhododendron Englemann spruce trembling aspen balsam poplar	lodgepole pine black huckleberry black gooseberry bunchberry	black huckleberry black gooseberry bunchberry
Potential Forage For Wild Ungulates >20%	fireweed grasses ?		subalpine fir			
5 - 20%	black huckleberry	black huckleberry subalpine fir trembling aspen balsam poplar fireweed grasses ?	trembling aspen balsam poplar		black huckleberry	black hucleberry
Comments:	These habitat units are roughly equivalent to the B.C. Forest Service (MacKinnon, undated) ESSPn/01 site series. None of the RN units were sampled.					

Habitat Enhancement Plan
Dunlevy Inlet, Blk. A, D.L. 754 Williston Lk,

APPENDIX 3. PHOTOGRAPHY